

The front-end systems layer 14 may be any application and/or mechanism capable of using a plurality of presentation formats to process user requests and make data available to the end-user systems layer 12. The front-end systems layer 14 includes communication technologies, such as, for example, server-based web-sites, wireline and/or wireless communication networks, interactive voice response sites (IVRs) and/or any other devices or applications capable of corresponding with the end-user systems layer 12. The front-end systems layer 14 operates to process user requests received via the delivery technologies and create a request. The requests are transferred via the business service layer 16 to the back-end systems layer 18. In addition, the front-end systems layer 14 provides access by the delivery technologies to data received from the back-end systems layer 18 via the business service layer 16.

As used herein, the term "request" is a data solicitation that includes request parameters. The request parameters identify criteria used for selective retrieval of data. The criteria are based on selections made by users operating the delivery technologies.

The business services layer 16 may be any software architecture capable of performing a translation/interfacing function between the front-end systems layer 14 and the back-end systems layer 18. The business services layer 16 may operate within the hardware and software of the front-end systems layer 14, the back-end systems layer 18 and/or on a dedicated platform. An exemplary dedicated platform is at least one computer operating as a UNIX or NT server. The business services layer 16 provides a structure to facilitate the transfer of requests from the front-end systems layer 14 and transfer of data from the back-end systems layer 18. Applications within the business services layer 16 provide a generic translation mechanism and extensible data structure with application to a plurality of different delivery technologies. As such, the business services layer 16 provides a foundation for simplifying the configuration of an interface between delivery technologies, the front-end systems layer 14 and the back-end systems layer 18.

The back-end systems layer 18 may be any information system capable of storing and manipulating information. The back-end systems layer 18, may include, for example, mainframes, databases, servers, legacy systems or any other devices or systems used to store, display and manipulate data and other information. As used

herein, the term legacy systems includes those systems operating with custom built applications, obsolete applications, proprietary operating systems, obsolete hardware or any other business logic, business information storage and/or hardware not capable of directly interfacing with the front-end systems layer 14 and/or the delivery technologies.

During operation, user requests are initiated with different delivery technologies within the end-user systems layer 12. The user requests may be processed by the front-end systems layer 14 and formulated into a request. The request may be provided to the business services layer 16. Within the business services layer 16, the request may be identified and translated to form an input message. The input message may include a plurality of fields containing data representing request parameters. The request parameters may be extracted from the input message with custom application code. The custom application code may be executed, based on identification of the request, to extract data from the back-end services layer 18 corresponding to the request parameters. The extracted data may be provided as a response. The response may be read into a plurality of fields created in an output message within the business services layer 16. The output message may be translated to a presentation format compatible with the delivery technology by the business services layer 16. The translated output message may then be provided to the front-end systems layer 14 where the data may be accessed by the delivery technology within the end-user systems layer 12.

FIG. 2 is a more detailed block diagram of the e-commerce software architecture 10 illustrated in FIG. 1. In the illustrated embodiment, the end-user system layer 12 includes at least one web user 22, at least one business-to-business (B2B) user 24, at least one voice user 26 and at least one wireless application protocol (WAP) user 28. In addition, the front-end systems layer 14 includes presentation formats. The presentation formats are represented by at least one hypertext markup language (HTML) page 32, at least one extensible markup language (XML) page 34, at least one interactive voice response (IVR) - XML gateway page 36 and at least one website meta language (WML) page 38.

The end-user systems layer 12 and the front-end systems layer 14 are communicatively coupled as illustrated. More specifically, in this embodiment, the

web user 22 is communicatively coupled with the HTML page 32. The web user 22 represents individual users, such as, for example, individual consumers of goods and services. The web user 22 accesses the HTML page 32 using delivery technologies such as, for example, a browser and the Internet, an intranet, an extranet or some other type of communication pathway. The HTML page 32 uses the hypertext markup language as a presentation format for the delivery technologies. The presentation format provides the communication mechanism for communicating requests and data.

The B2B user 24 of this embodiment is communicatively coupled with the XML page 34. The B2B user 24 represents businesses accessing the XML page 34, such as, for example, the computer system of one business interfacing with the computer system of another business. Applications such as, for example, home banking software applications used by retail customers on their home computers, customer orders to investment companies or any other business to business or business to consumer related services may be operated by the B2B user 24. Exemplary delivery technologies may include a browser, proprietary communication software or any other communication mechanism for communicating requests and data. Communication between the computer systems may be over the Internet, an intranet, an extranet, a dedicated communication channel and/or any other form of communication link. The presentation format for communicating data and requests represented by the XML page 34 is the extensible markup language.

The voice user 26 of this embodiment is communicatively coupled with the IVR-XML gateway 36, which is in turn communicatively coupled with the XML page 34. The voice user 26 represents wireline and wireless speech driven delivery technologies operatively cooperating with the IVR-XML gateway 36. An example being users communicating by cellular and wireline telephones with the IVR-XML gateway 36. The IVR-XML gateway 36 may be any converter capable of converting between speech and the extensible markup language used with the XML page 34. As such, this presentation format is the combination of extensible markup language and speech communication to interface with the voice user 26.

The WAP user 28 represents wireless interfaces. In this embodiment, the WAP user 28 interfaces with the WML page 38 using some form of wireless communication to exchange information. Exemplary WAP users 28 are users